CS 378 Lab: Endsem [Max Marks = 20; Weightage = 20%]
OSL, Mon Oct 29, 2012 (2:00pm to 5:00 pm)

General instructions:

1. This lab endsem is to be done in **individually.** No form of collaboration or communication with others. Penalty for violation: **-20** marks.
2. You have 15 minutes to download whatever items you think you need. Network access will be cutoff at 2:15 pm.
3. Create a directory called <rollnumber>_lab-endsem. As you proceed with the lab activities below, note down observations or relevant output from whatever you do in a file named “lab-endsem.txt” using a text editor.
4. **Write Your Name and Roll Number in “lab-endsem.txt”.**

Lab Activities:

1. **tcpdump [3 marks]**: Capture ICMP packets in a file exer1.out. Generate ICMP packets by using: (i) 'ping' and (ii) 'tracepath'. Open the exer1.out in wireshark and answer the following: How many different variety of ICMP messages did you observe in the trace file? What is the type/code value of each of this message?

2. **ns2 [3 marks]:** Create a file called ns-lab-endsem.tcl. Write ns2 script to do:

   Create a topology of 4 nodes n0, n1, n2, n3, having links as:

   n0 <----> n2 link 5 Mbps, delay 2ms, drop tail AQM

   n1 <----> n2 link 5 Mbps, delay 2ms, drop tail AQM

   n2 <----> n3 link 1.5 Mbps, delay 10ms, drop tail AQM

   Attach agents:

   UDP agent (CBR traffic) at node 0 - cbr0

   UDP agent (CBR traffic) at node 1 - cbr1

   TCP agent (FTP application) at node 0 - ftp

   Schedule following events:

   1.0 start cbr0

   1.1 start cbr1

   1.2 start ftp

   5.0 stop ftp

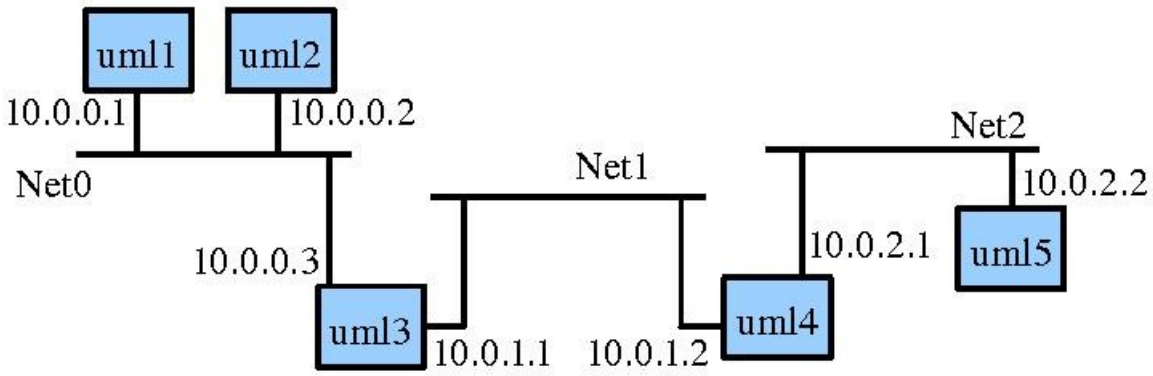
   stop simulation at 6.0

   Calculate ratio of TCP_bytes to UDP_bytes transferred (to n3). Calculate bytes dropped for UDP (cbr0), UDP (cbr1) and TCP (ftp).

3. **VNUML [7 marks]:** Create the topology shown below in vnuml. You may modify the xml files from your vnuml labs (lab06 and lab07). Ensure that the subnet mask for all the interfaces corresponds to netmask 255.255.255.0 (use ifconfig, if necessary).

   (i) Ping 10.0.1.1 from uml1. Explain why this ping did not work? (*Hint:* Run tcpdump on uml2/uml3 and "route -n" at uml1, to figure out what happened.)

   (ii) Configure the routing table at uml1 so that the above ping works. What are the configuration command(s) that you used to make the ping work?



4. **Socket/RPC [7 marks]:** Implement a name registrar that provides the following services: (i) *register*: registers (stores) the name supplied by the client, (ii) *unregister*: deletes the name from the set of stored names, and (iii) *list*: provides a list of registered names.

   You may use **either** Socket **or** RPC programming to implement the name service. You may use the code that your group wrote for socket programming lab (lab08) and rpc programming lab (lab09).

   Note down in lab-endsem.txt - (i) list of files that you have written, (ii) instructions for generating the executable from your source code, (iii) instructions for executing your client and server, and (iv) test cases that you used to check your application.

Submission instructions

The directory named <rollnumber>_lab-endsem that you will submit should contain the following files:

1. lab-endsem.txt
2. exer1.out
3. ns-lab-endsem.tcl
4. ns2 plots (if any)
5. vnuml xml file
6. source code for Socket/RPC

Now tar the directory and submit the file <rollnumber>_lab-endsem.tgz via moodle.

-END-